

CLAIMS

1. A device for switching ATM cells establishing a single path per virtual circuit, having $N.R$ inputs and $N.R$ outputs, N and R being two integers not less than two,
 5 the device comprising at least two stages, including an inlet stage $(21; 31; 411_1, \dots, 411_R)$ having $R.N$ sets of Q outputs $(213_{11}; 313_{11}; 413_{11})$ and an outlet stage $(22; 33; 421_1, \dots, 422_R, \dots)$ having $R.N$ sets of Q' inputs $(223_1; 333_1; 442_1),$

characterized in that for the flow of data carried by any intermediate link $(213_i, 222_j; 313_i, 332_j, 413_i, 423_j)$ that is part of the single path set up between an input and an output to be a subset of the incoming flux at that input and also a subset of the outgoing flux at that output, each input $(212_1; 312_1; 412_1)$ of the inlet stage can be connected to an output of the inlet stage which can be selected only from Q outputs $(213_{11}, \dots, 213_{R1}; 313_1, \dots, 313_{1R}; 413_{11}, \dots, 413_{1R})$ exclusively associated with that input; and

20 in that each output $(223_1; 331_1; 422_1)$ of the outlet stage can be connected to an input of the outlet stage which can be selected only from Q' inputs $(222_{11}, \dots, 222_{1R}; 332_{11}, \dots, 332_{R1}; 423_{11}, \dots, 423_{1R})$ of the outlet stage exclusively associated with that output.

25 2. A switching device according to claim 1 including only one inlet stage (21) and one outlet stage (22) each including N switching matrices, characterized:

in that, Q being equal to N , each matrix (211_1) of the inlet stage has R inputs $(212_1, \dots, 212_R)$ and $R.N$ outputs $(213_{11}, \dots, 213_R)$ organized into R sets of N outputs, each set corresponding to a respective one of the R inputs; in that each input (212_1) of that matrix can be connected to an output of that matrix which can be selected only from N outputs $(213_{11}, \dots, 213_{R1})$ of the set of outputs corresponding to that input;

in that, Q' being equal to N , each matrix of the

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outlet stage has R outputs ($223_1, \dots, 223_R$) and $N.R$ inputs ($222_{11}, \dots, 222_{1R}$); and in that each output (223_1) of that matrix can be connected to an input of that matrix which can be selected only from $R.N$ inputs ($222_{11}, \dots, 222_{1R}$) of that matrix; and

in that each of the N outputs ($213_{11}, \dots, 213_{1N}$) of each set of outputs of the first stage is connected to an input ($222_{11}, \dots$) of a respective one of the N matrices of the outlet stage,

3. A switching device according to claim 1 including an inlet stage (31), a central stage (32), and an outlet stage (33); characterized:

- in that, Q being equal to R , the inlet stage (31) comprises N matrices ($311_1, \dots$) each having R inputs ($312_1, \dots$) and R^2 outputs ($313_{11}, \dots$), those outputs being organized into R sets of R outputs each corresponding to one of said R inputs, and in that each input (312_1) of that matrix can be connected to an output of that matrix which can be selected only from R outputs ($313_{11}, \dots, 313_{R1}$) of the set of outputs corresponding to that input;

- in that the central stage (32) comprises R sets of R matrices ($321_{11}, \dots$) each having N inputs and N outputs, the R outputs of each set of outputs of the inlet stage being connected to inputs belonging to the same set of R matrices of the central stage; and

- in that, Q' being equal to R , said outlet stage (33) comprises N matrices ($331_1, \dots$) each of those matrices having R^2 inputs ($332_1, \dots$) and R outputs ($333_1, \dots$), those R^2 inputs being organized into R sets of R inputs, each set respectively corresponding to one of those R outputs; and in that each output ($323_1, \dots$) of that matrix can be connected to an input of that matrix which can be selected only from R inputs ($322_{11}, \dots, 322_{R1}$) of the set of inputs corresponding to that output; and in that the R inputs ($322_{11}, \dots, 322_{R1}$) of each set are respectively connected to R outputs respectively belonging to the R

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sets of matrices of the central stage (32).

4. A switching device according to claim 1 including an inlet stage (411₁, ...), a central stage (414₁, ...), and an outlet stage (421₁, ...); characterized:

- in that Q and Q' are equal to R ,
- in that the central stage includes R^2 matrices,
- in that the inlet stage and the outlet stage each comprise $R.N$ switching matrices,
- in that the matrices of the inlet stage and the matrices of the central stage are organized into R sets (41₁, ...) each including N matrices of the inlet stage and R matrices of the central stage and the matrices of the outlet stage are organized into N sets (42₁, ..., 42 _{N}) of R matrices;
- in that each of the $R.N$ matrices (311₁, ...) of the inlet stage has a single input (412₁) and R outputs (413₁₁, ...),
- in that each of the R^2 matrices (414₁, ...) of the central stage has N inputs and N outputs, the N inputs being respectively connected to an output of each of the matrices (411₁, ..., 411 _{R}) of the inlet stage that belong to the same set of matrices; and
- in that each of the $R.N$ matrices of the outlet stage has R inputs (423₁) and a single output (422₁), those R inputs being connected to outputs respectively belonging to the R sets of matrices of the central stage and of the inlet stage.

5. A switching device according to claim 3 or ~~claim 4~~, characterized in that $N = 2R^2$.

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